We Claim:

1. A data transmission system, comprising:

at least two stations between which data bursts being interchanged via radio, said stations including:

a first station having a first transmitter for up-mixing the data bursts from baseband to a first channel mid-frequency and for transmitting them, and a first receiver receiving the data bursts at a second channel mid-frequency and down-mixing them to an intermediate frequency, said first station having a first local oscillator producing a first local frequency required for up-mixing from the baseband to the first channel mid-frequency and required for down-mixing from the second channel mid-frequency to the intermediate frequency; and

a second station having a second transmitter up-mixing the data bursts from the baseband to the second channel mid-frequency and transmitting them, and a second receiver receiving the data bursts at the first channel mid-frequency and down-mixing them to the intermediate frequency, a frequency hop between the first channel mid-frequency used for a downlink transmission from said first station to said second station and the second channel mid-frequency used for an uplink transmission

from said second station to said first station has a magnitude corresponding to a magnitude of the intermediate frequency, said second station having a second local oscillator producing a second local frequency required for up-mixing from the baseband to the second channel mid-frequency and required for down-mixing from the first channel mid-frequency to the intermediate frequency.

2. The data transmission system according to claim 1, wherein the first channel mid-frequency is chosen on a pseudo-random basis.

3. The data transmission system according to claim 1, wherein data is transmitted using a frequency hopping method, with the channel mid-frequency being changed after each transmitted data burst.

4. The data transmission system according to claim 1, wherein the channel mid-frequency is constant during a transmission of a data burst.

5. The data transmission system according to claim 1, wherein a difference between the first channel mid-frequency and the second channel mid-frequency is a noninteger multiple of channel separation.

6. The data transmission system according to claim 1, wherein said first and second local oscillators are frequency-stabilized by a phase locked loop.

7. The data transmission system according to claim 1, further comprising means for producing guard time intervals between various data bursts.

8. The data transmission system according to claim 7, wherein a length of a guard time interval between the downlink transmission from said first station to said second station and the uplink transmission from said second station to said first station corresponds approximately to a clock drift of a corresponding one of said first and second local oscillators.

9. The data transmission system according to claim 1, wherein said first and second stations have means for producing identification information at a start of a transmission of each data burst.

10. The data transmission system according to claim 1, wherein transmission frequencies within an ISM frequency band are used.

11. The data transmission system according to claim 1, wherein said first station and said second station are part of a piconetwork.

12. The data transmission system according to claim 1, wherein one of said first and second stations is a base station and the other is a mobile station.

13. The data transmission system according to claim 1, wherein the data transmission system can be used in cordless communication systems, in computer-controlled entertainment systems, or in computer-controlled games systems.

14. A method for data transmission between at least two stations via radio paths using a frequency hopping method, which comprises the steps of:

up-mixing from baseband and transmitting a first signal from a first station to a second station at a first channel mid-frequency;

receiving the first signal in the second station and down-mixing the first signal to an intermediate frequency;

up-mixing from the baseband and transmitting a second signal from the second station to the first station at a second

channel mid-frequency differing from the first channel mid-frequency by the intermediate frequency;

receiving the second signal in the first station and down-mixing the second signal to the intermediate frequency;

producing a first local frequency required for up-mixing from the baseband to the first channel mid-frequency and required for down-mixing from the second channel mid-frequency to the intermediate frequency using a first local oscillator in the first station; and

producing a second local frequency required for up-mixing from the baseband to the second channel mid-frequency and required for down-mixing from the first channel mid-frequency to the intermediate frequency using a second local oscillator in the second station.

15. The method according to claim 14, which further comprises choosing the first channel mid-frequency on a pseudo-random basis.

16. The method according to claim 14, which further comprises transmitting data using the frequency hopping method, and changing the channel mid-frequency after each transmitted data burst.

17. The method according to claim 14, which further comprises setting the channel mid-frequency to remain constant during the transmission of a data burst.

18. The method according to claim 14, which further comprises including guard time intervals between the transmission of the various data bursts.

19. The method according to claim 14, which further comprises choosing a noninteger multiple of channel separation as the intermediate frequency.

20. A data transmission system, comprising:

at least two stations between which data bursts being interchanged via radio, said stations including:

a first station having a first transmission means for up-mixing the data bursts from baseband to a first channel mid-frequency and transmitting them, and a first reception means for receiving the data bursts at a second channel mid-frequency and down-mixing them to an intermediate frequency, said first station having a first local oscillator producing a first local frequency required for up-mixing from the baseband to the first

channel mid-frequency and required for down-mixing from the second channel mid-frequency to the intermediate frequency; and

a second station having a second transmission means for up-mixing the data bursts from the baseband to the second channel mid-frequency and transmitting them, and a second reception means for receiving the data bursts at the first channel mid-frequency and down-mixing them to the intermediate frequency, a frequency hop between the first channel mid-frequency used for a downlink transmission from said first station to said second station and the second channel mid-frequency used for an uplink transmission from said second station to said first station has a magnitude corresponding to a magnitude of the intermediate frequency, said second station having a second local oscillator producing a second local frequency required for up-mixing from the baseband to the second channel mid-frequency and required for down-mixing from the first channel mid-frequency to the intermediate frequency.